13 Elements of Stormwater Pollution Prevention Plans

- Mark Clearing Limits
- Establish Construction Access
- Control Flow Rates
- Install Sediment Controls
- Stabilize Soils
- Protect Slopes
- Protect Drain Inlets
- Stabilize Channels & Outlets
- Control Pollutants
- Control De-watering
- Maintain BMPs
- Manage the Project
- Protect LID BMPs

SWPPP Element 1:
Preserve Vegetation/Mark Clearing Limits

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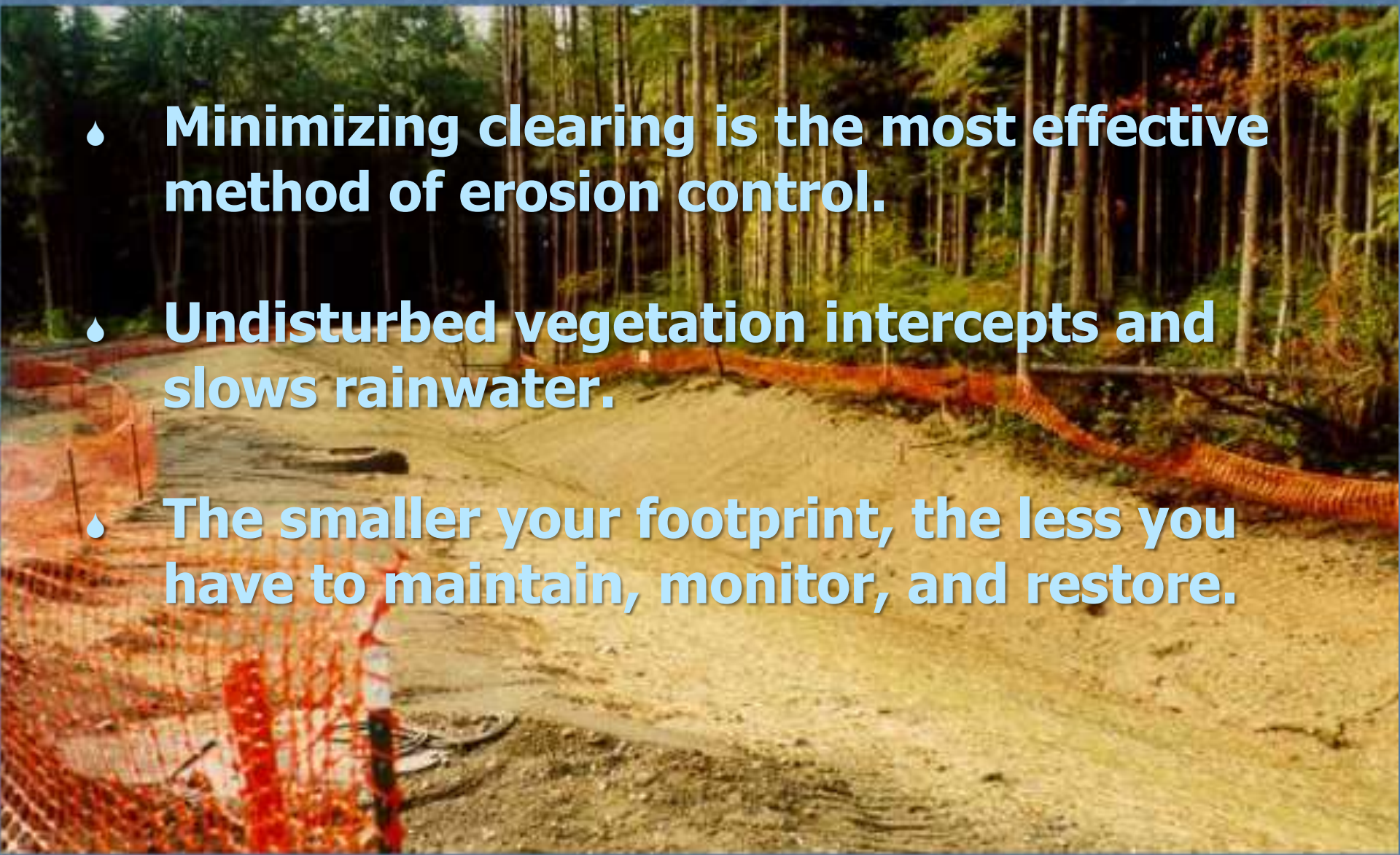


- Minimizing clearing is the most effective method of erosion control.
- Undisturbed vegetation intercepts and slows rainwater.
- The smaller your footprint, the less you have to maintain, monitor, and restore.

SWPPP Element 1:
Preserve Vegetation/Mark Clearing Limits

WHEN:

1. Before beginning land-disturbing activities

WHAT:

1. Mark all clearing limits
2. Mark all sensitive areas & buffers
3. Mark all trees to be preserved

HOW:

- With fences, barriers, flagging and signage.

SWPPP Element 1: Preserve Vegetation/Mark Clearing Limits

Courtesy Dwayne Stenlund CPESC MNDOT

SWPPP Element 1: Preserve Vegetation/Mark Clearing Limits

SWPPP Element 1: Preserve Vegetation/Mark Clearing Limits

Preserve Natural Vegetation

- Plant roots hold soil in place. Dead vegetation acts as a mulch cover.
- A living filter to reduce soil erosion and runoff velocities.

BMP C102

SWPPP Element 2: Establish Construction Access

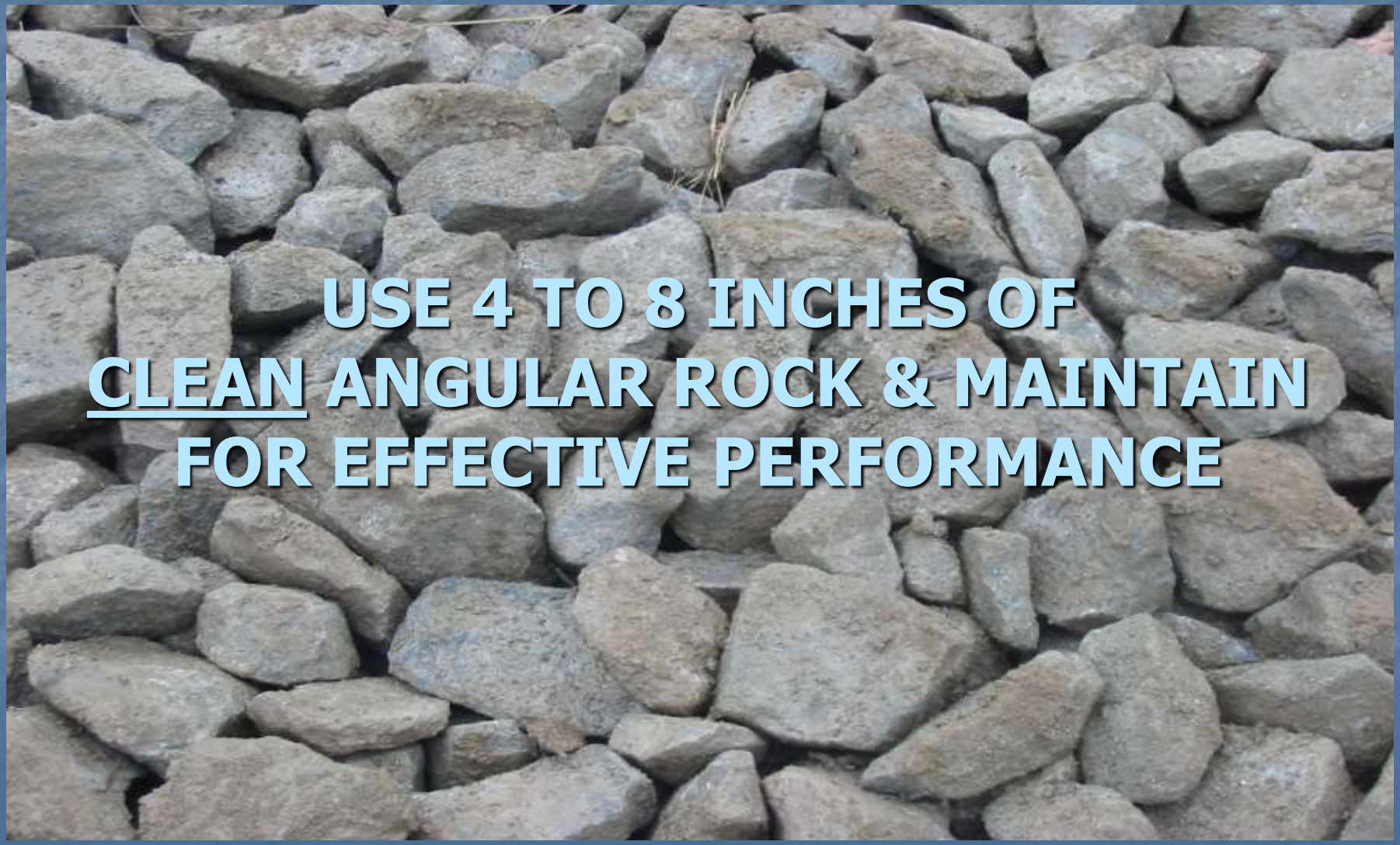
THE BASICS:

- Limit access and exit to one route where possible
- Stabilize access and exit points with a pad of quarry spalls, crushed rock, or other equivalent BMPs to minimize tracking dirt onto roadway.

SWPPP Element 2: Establish Construction Access

- Prevent parking on disturbed soils wherever possible.
- Provide stabilized parking areas

SWPPP Element 2: Establish Construction Access (Quarry Spall)



SWPPP Element 2: Establish Construction Access (Quarry Spall)

SWPPP Element 2: Establish Construction Access (Quarry Spall)

Multiple Lot - Development

Modified Rumble Strip

SWPPP Element 2: Establish Construction Access (Quarry Spall)

SWPPP Element 2: Establish Construction Access (Wheel Wash)

- Locate wheel wash or tire baths on-site, if the stabilized entrance is not working.
- Clean sediment tracked off-site at the end of each day, or more frequently if necessary.

SWPPP Element 2: Establish Construction Access (Wheel Wash)

Asphalt lined tire bath

Automated Wheel Wash

SWPPP Element 2: Establish Construction Access (Wheel Wash)

- Wheel Wash water is considered process water and can not be discharged with stormwater
- Tire spraying may still be necessary to control trackout

SWPPP Element 2: Establish Construction Access (What's Wrong?)

SWPPP Element 2: Establish Construction Access (What's Wrong?)

SWPPP Element 2: Establish Construction Access (What's Wrong?)

SWPPP Element 3: Control Flow Rates

- Requires the construction of retention and detention facilities (Sediment ponds & traps)
- Assures these facilities function properly

SWPPP Element 3: Control Flow Rates

- Downstream analysis may be necessary to ensure the protection of properties and waterways downstream of development from increased volume and velocity

SWPPP Element 3: Control Flow Rates

Typically an engineering issue except when:

- Contractor modifies designed facilities
- Contractor adds temporary facilities not shown on plans
- Contractor pumps water offsite

SWPPP Element 3: Control Flow Rates

If permanent infiltration ponds are used for flow control during construction, you must install sediment control BMPs such as a sediment pond prior to the infiltration pond to protect it from siltation during the construction phase

SWPPP Element 4: Install Sediment Controls

- Sediment Controls are BMPs Installed to Prevent Sediment from Leaving Your Site
- Most Sediment Control Devices function by ponding and settling water. Not by filtration.
- Without Application of Sediment Control BMPs Stormwater Runoff Cannot Be Properly Controlled

SWPPP Element 4:
Install Sediment Controls

The Requirement:

- Prior to leaving a construction site or prior to discharge to an infiltration facility, stormwater runoff from disturbed areas shall pass through a sediment pond or other appropriate sediment removal BMP.

SWPPP Element 4: Install Sediment Controls

Standard Sediment Control BMPs

- Silt Fence
- Vegetated Strip
- Straw Wattles
- Sediment Trap
- Temporary Sediment Pond
- Filter Berms and Barriers

Advanced Sediment Control BMPs

- Stormwater Chemical Treatment
- Stormwater Filtration
- Electro Coagulation

SWPPP Element 4: Install Sediment Controls (Temporary Sediment Pond)

- Use where contributing drainage area is 3 acres or more
- They do not remove sediment smaller than medium silt (.02mm)
- Consequently, they provide little reduction in turbidity

BMP C241

SWPPP Element 4: Install Sediment Controls (Sediment Trap)

- Small temporary ponding area with a gravel outlet
- Used to collect and store sediment
- Drainage area is less than 3 acres
- Design life of approximately 6 months
- Removes coarse sediments only!

BMP C240

SWPPP Element 4: Install Sediment Controls (Vegetated Strip)

- Great place to discharge Sediment pond and trap waters to further reduce entrained sediment
- Reduce the runoff velocities of overland flow

SWPPP Element 4: Install Sediment Controls (Straw Bale Barrier)

- Most used but least effective BMP
- Use where drainage area is less than ¼ acre
- Use where effectiveness is required for less than 3 months
- DO NOT USE IN STREAM, CHANNELS OR DITCHES

SWPPP Element 4: Install Sediment Controls
(Compost Berms and Socks)

Compost Sock

Compost Berms

SWPPP Element 4: Install Sediment Controls (Compost Berms and Socks)

Compost Socks

- To reduce transport of sediment – Physical barrier
- Organic material in sock may reduce metal and petroleum hydrocarbon concentrations
- Used in sensitive environmental areas – little disturbance needed to install
- Not intended to treat substantial amounts of overland flow
- May be seeded after installation to provide extra filtering for long term installation

Compost Berms

- To reduce transport of sediment – Physical barrier
- Organic material in sock may reduce metal and petroleum hydrocarbon concentrations
- May increase phosphorous in effluent data
- Not intended to treat concentrated flows
- May be seeded after installation to provide extra filtering for long term installation

SWPPP Element 4: Install Sediment Controls (Silt Fence)

- Reduces the transport of coarse sediment by providing physical barrier to sediment and reducing runoff velocities
- Not intended to treat concentrated flows
- Should not be constructed in streams or in V-shaped ditches

SWPPP Element 4: Install Sediment Controls

(Silt Fence)

- Posts spacing no greater than 6’ if not wire backed.
- Up to 8’ for wire backed
- Maintain at least 2’ of fencing above deposited soils.
- Sheet flow only
- Trench into ground using 4”X4” trench
- Pull tight and place ends up slope
- Use parallel to slope contour

Courtesy DNREC

SWPPP Element 4:
Install Sediment Controls
(Silt Fence)

- Not all materials are the same, use specified fabrics
- Trenching in the silt fence is one of the most important part of the installation.
- Be aware of your post spacing
- Install on contour to prevent channelizing flows along the fence. Repair damaged sections as soon as possible.

SWPPP Element 4: Install Sediment Controls (Chemical Treatment)

- Removes fine silt to meet water quality standards
- Requires Ecology written permission
- Discharges must be nontoxic to aquatic organisms
- Costly to implement
- Other onsite ESC controls may interfere with treatment success (PAM)
- Chitosan Enhanced Sand Filtration is the most common form
- Can handle high volumes and turbidity

SWPPP Element 4: Install Sediment Controls (Construction Stormwater Filtration)

- Typically used in conjunction with gravity settling to remove sediment as fine as silt.
- In some cases filtration alone may be able to achieve water quality standards
- Does not require Ecology permission to use if not used in conjunction with chemical flocculants.

SWPPP Element 4: Install Sediment Controls
(What's Wrong?)

SWPPP Element 4: Install Sediment Controls
(What's Wrong?)

SWPPP Element 4: Install Sediment Controls (What's Wrong?)

SWPPP Element 5: Stabilize Soils

The permittee must stabilize exposed and unworked soils by application of effective BMPs:

- Temporary and Permanent Seeding
- Mulching
- Nets and Blankets
- Plastic Covering
- Sodding
- Topsoiling
- Polyacrylamide for Soil Erosion Protection
- Surface Roughening
- Gradient Terraces
- Dust Control

SWPPP Element 5: Stabilize Soils

Ecology NPDES CSWGP

- The permittee must not allow soils to remain exposed and unworked for more than the following time periods West of the Cascade Mountain Crest
  - During the Dry Season (May 1 – Sept. 30): 7 Days
  - During the Wet Season (October 1 - April 30: 2 Days
- Additionally, you must stabilize soils before the end of the shift before a holiday or weekend, based on weather forecast

SWPPP Element 5: Stabilize Soils (Temporary and Permanent Seeding)

- On disturbed areas that have reached final grade or that will remain unworked for more than 30 days.
- Schedule stabilization around optimum seeding windows.
- Protect seed with mulch or plastic in cold weather.
- Irrigate in dry weather until 75% cover established.
- Just 40% Cover can give you a 90% reduction in erosion

KC SWDM: D.3.2.6

SWPPP Element 5: Stabilize Soils (Mulching)

Straw Application Rate	Erosion Reduction
½ Ton Per Acre	75%
1 Ton Per Acre	87%
4.5 Ton Per Acre	98%

- Provide immediate temporary protection from erosion
- Enhances plant establishment, by providing seed cover and moisture protection
- On disturbed areas that require cover measures for less than 30 days.
- Types of mulch:
  - Straw
  - Wood chips
  - Compost
  - Hydromulch (BFM)

KC SWDM D.3.2.2

SWPPP Element 5: Stabilize Soils (Nets and Blankets)

- Reinforce turf
- Prevent erosion & hold seed and mulch in place
- Organic: biodegrade in place, 1-5 years
- Inorganic: long term high stress applications

KC SWDM D.3.2.3 or SWMMWW BMP C122

SWPPP Element 5: Stabilize Soils (Plastic Covering)

- Used on disturbed areas that require cover for less than 30 Days
- Protect cut and fill slopes, stockpiles, and ditches from erosion.
- Use to create a "greenhouse" effect

KC SWDM D.3.2.4 or SWMMWW BMP C123

SWPPP Element 5: Stabilize Soils (Plastic Covering)

- Dramatically increases runoff velocity and volume
- Install water collection measures at the base of the slope
- Don't mix clean runoff from plastic with dirty runoff

KC SWDM D.3.2.4

SWPPP Element 5: Stabilize Soils (Topsoiling)

- To provide suitable growth medium for final site stabilization with vegetation
- Consult manual or local permitting agency for appropriate depth
- Improves:
  - Soil Structure
  - Moisture adsorption
  - Soil Nutrients
  - Surface Porosity

SWDM D.3.29

SWPPP Element 5: Stabilize Soils (Soil Roughening)

- Use on all slopes steeper than 3:1 and greater than 5 vertical feet
- Stair-step grading
- Grooving
- Contour Furrows
- Tracking/ Imprinting

KC SWDM D.3.2.1

SWPPP Element 5: Stabilize Soils (Dust Control)

- Dust becomes a stormwater issue when not managed
- Use water sprinkling
- Cover stock piles
- Sweep streets
- Cover your loads

SWPPP Element 5: Stabilize Soils
(What's Wrong?)

SWPPP Element 5: Stabilize Soils (What's Wrong?)